Public Works (1906) Department.

1

G.O., No. 1200 } 1201 } I

DATED 22-12-1906.

100 copies of G.O.
2 23 copies of Estt.
1/2 with docket at the back for the S.G.
40 copies of Estt. for records

22-12-06

(30)

[Despatch Abstract.]

Periyar lake & tunnel, Madura Dt.

An estimate, amounting to Rs 1,23,000, for widening & deepening the watershed cutting between the ——— & blocking up the curved passages & driving a "heading" through the island in the tunnel leading from the lake, ~~sanctioned~~ approved and a copy of the Pros: together with the plans & estimate for the work, ordered to be forwarded to the ... for sanction

Indexed

பாதுகாப்பு பிரிவு

செப்பனிடுபவர் பெயர்

செப்பனிடுவதற்காக எடுத்துக் கொள்ளப்பட்ட நாள். 1-2011

செப்பனிட்டு முடித்த நாள். 1-2011

12/1/11 13/1/11 13/1/11

சரிபார்க்கும் முதல் முறையான கையொப்பம்	சரிபார்க்கும் 2ம் முறையான கையொப்பம்	ஆராய்ச்சி உதவியாளர் கையொப்பம்

FURTHER PAPERS

...ent.	Date.	G.O.	No.

IRRIGATION.
ACCOUNT.

Government of Madras.

PUBLIC WORKS DEPARTMENT.

Recd. } 1906. *Enclosures*

Regd. *Spare copies*

G.O., Nos. 1200, 1201 I., 22nd December 1906.

Periyar lake and tunnel, Madura district

8. Forwarding for sanction an estimate, amounting to Rs. 1,23,000, for widening and deepening the watershed cutting between the —. and blocking up the curved passages and driving a "leading" through the island in the tunnel leading from the lake.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following papers :—

I

To the Superintending Engineer,	VI Circle,	dated	7th July 1906,	No.	2374.
From the ,,	VI ,,	,,	7th Aug. ,,	,,	463 C.E.
Telegram to ,,	VI ,,	,,	12th Oct. ,,		
From the ,,	VI ,,	,,	16th ,,	,,	No. 608 C.E.
,, ,,	VI ,,	,,	20th ,,	,,	,, 615 C.E.

ENCLOSURES.

Report to accompany the estimate for widening and deepening the watershed between the Periyár lake and tunnel.

	RS.
Amount of estimate	90,000

The highest point along the watershed cutting is + 115·21 and the sill of the head sluice at the entrance to the tunnel is + 106·75, so if the cutting were lowered and enlarged, another 8 feet, approximately, of water could be drawn off from the lake every year. Not only is the cutting too high, but it is also too narrow, the bed width being only 21 feet. The result is that this restricted approach channel causes loss of head, and still further reduces the level of the water at the head of the tunnel. An examination of the accompanying table showing loss of head at different levels discloses the fact that, when the water level of the lake falls below + 120·50, full supply cannot be sent through the tunnel and that, when it falls to + 118·70, there is only 4 feet of water at the head of the tunnel.

2. An estimate has now been prepared for deepening and widening the cutting, based on the assumption that when the tunnel is flowing just full bore, the discharge is about 1,100 cusecs. The channel cutting must therefore be designed to carry this discharge with a depth of 10 feet which is the height of the tunnel. The estimate has been prepared allowing a bed fall through the cutting of 1 foot per mile with this fall and a depth of water of 10 feet, a channel 35 feet wide is required. This will bring the highest point of the cutting down to + 108·00 (approximately).

3. The capacity of the lake at its present—

	Mills. c.ft.
F.T.L. at + 144·00 is	13,299
Do. + 118·00 is	7,340
The amount of water now available for irrigation is	5,959

No. 1200 I., 22nd December 1906.

The additional amount of water that will be available for irrigation after the lowering of the cutting will be—

		Mills. c.ft.
Capacity at + 118·00 =	... ...	7,359
Do. at + 108·00 =	... ...	5,691
		1,668

To arrive at the value of the extra storage of 1,668 millions cubic feet provided by this proposal it is necessary to consider what its effect would have been in past years. The extra storage capacity is only useful in a year when the two following conditions are fulfilled :—

(1) that there is no available water left in the lake at the end of the year, and

(2) that the extra supply was available either in the year under consideration or by surplus from a previous year.

Careful examination of the records of discharges show that in the ten years during which the project has been working both these conditions are fulfilled only in 1898–1899 and 1904–1905, the other years of short supply 1899–1900 and 1905–1906 followed these and there was no water available in the river beyond what was actually used and the only effect of the proposed works would have been that the reservoir started and ended at a lower level. The value to irrigation of the extra storage of 1,668 millions cubic feet in a bad year is however not to be measured by the area which this quantity of water could irrigate for a whole season but by the much greater area, perhaps 5 or 6 times the above, which it would bring to maturity and save remissions upon, it is only a month's supply that is required and the value to Government in either of the two useful years would be Rs. 4 × 5 × 5 × 1,668 = Rs. 1,66,800 at the rate of 4 acres to the million cubic feet and 5 per acre.

Thus the average annual value would be on the ten years $\frac{2}{10} \times$ 1,66,800 = Rs. 33,360 or 33 per cent. on the proposed expenditure.

C. A. Smith,
Chief Engineer for Irrigation.

10th December 1906.

Report to accompany the estimate for blocking up the curved passages and driving a heading through the "island" in the tunnel leading from the Periyár lake.

		RS.
Amount of estimate ...	... ...	10,000

When the tunnel was made it was the intention of Colonel Pennycuick to control the discharge by means of balance gates, placed facing one another, a little way down the tunnel from the mouth. The proposal was at once found impracticable, and a single shutter was placed at the head of the tunnel. The bifurcation, and subsequent rejoining of the tunnel passages, has always been considered to cause a diminished discharge through the tunnel and the work which has now been estimated for has frequently been proposed. The new heading will have a sectional area of 166 square feet, which is rather more than the average section of the tunnel. The proposed work is shown on the accompanying tracing.

S. B. Murray,
Superintending Engineer, VI Circle.

Table showing the discharge over Right Bank Escape of Periyár lake from 1899–1900 to 1904–1905.

Year.	June.	July.	August.	September.	October.	November.	December.	January.	Total.
1899–1900 ..	14·472	6,301·217	..	..	..	..	..	..	6,315·689
1900–1901 ..	..	3,362·88	10,584·466	143·891	..	1,314·052	31·567	..	15,436·856
1901–1902 ..	885·408	4,216·896	1,029·892	..	..	2,202·163	106·715	492·555	8,933·728
1902–1903 ..	..	..	..	..	4,236·747	5,703·565	5,067·213	..	15,007·525
1903–1904 ..	..	1,606·700	3,206·751	902·955	1,452·186	471·675	3,668·022	..	11,268·289
1904–1905 ..	3,687·344	7,142·480	1,951·405	..	..	..	..	..	12,781·229
1905–1906 ..	*Nil.*	..	..	..	..	..	..	..	*Nil.*

Note.—All figures are in millions of cubic feet.

A. R. DeChazal,
Executive Engineer, Madura Division.

II

Note by the Chief Engineer for Irrigation.

The Superintending Engineer, VI Circle, submits two estimates, aggregating Rs. 1,00,000—

(1) for widening and deepening the watershed-cutting between the Periyár lake and the tunnel, and

(2) for blocking up the curved passages and driving a "heading" through the island in the tunnel leading from the lake; these estimates have been prepared on the suggestion of the Inspector-General of Irrigation, after his recent inspection of the works—*vide* letter from the Government of India, No. 575 I., dated 4th May 1906, printed with G.O., No. 702 I., dated 2nd June 1906.

2. With regard to the first estimate, it is stated that the present cutting between the Periyár lake and the tunnel is too narrow and insufficiently deep, the bed-level at its highest point being + 115·21, while the sill of the headsluice in front of the tunnel is + 106·75, with the result that loss of head and reduction in the level of water are thereby caused at the head of the tunnel. Under the conditions obtaining at present, full supply cannot be sent down the tunnel when the water in the lake falls down to + 120·50, and no supply can be drawn from the lake below + 115·21.

3. The estimate, therefore, provides for widening the cutting from 21 to 35 feet with bed-fall of 1 foot per mile so as to bring the highest point of the cutting down to + 108·00 nearly. This will enable it to discharge, with a depth of 10 feet, 1,100 cubic feet per second which is the maximum quantity the tunnel is estimated to pass when it is flowing full bore.

4. The above improvements, if carried out, will, it is stated, enable another 8 feet of water to be drawn off for irrigation from the lake every year, thus providing an additional storage of 1,668 millions cubic feet.

5. The value to irrigation of this extra storage in a bad year should not be measured by the additional area which it would supply for a whole season but by the area that it will protect from failure and bring to maturity by providing an extra month's supply as pointed out in the report. It is estimated that the average annual revenue will be Rs. 33,360 equivalent to a return of about 33 per cent. on the proposed expenditure.

6. The execution of this work will depend greatly upon the state of the season as it would be unwise to purposely run water to waste in order to carry it out.

7. As regards the other estimate, the original design consisted of two semicircular passages at the mouth of the tunnel with a double faced gate closing their entrances into it so that the water pressures on the gate would counteract one another. This design being found unworkable, a single gate was placed at the head of the tunnel, above the passages. As the bifurcation and the subsequent rejoining of the tunnel passages have always been considered to cause a diminished discharge through the tunnel, it is now proposed to close them and to make a straight cut with a sectional area 166 square feet rather more than that of the tunnel itself.

8. As the two estimates relate to one and the same work, they have been merged into one, amounting to Rs. 1,00,000 or Rs. 1,23,000 including establishment charges, which it is recommended, may be approved and forwarded to the Government of India for sanction under the Open Capital Account of the Periyár project.

9. As the execution of the work now provided for will in no way interfere with any further increase of discharging capacity which may be found necessary in connection with the other works suggested in the Inspector-General's note and as its benefit will be felt as soon as it is completed, it is considered that it should be sanctioned separately.

10. The work is classed as "remunerative" and will probably be complete[illegible] 31st March 1910.

C. A. SMITH,
Chief Engineer for Irrigation.

15th December 1906.

Order—No. 1200 I., dated 22nd December 1906.

The following estimate is approved :—

Imperial.
Capital expenditure not charged to Revenue.
49. Irrigation.
Periyár Project.
Open Capital Account.
I. Works.
1. Head Works.
L. Earthwork.

Widening and deepening the watershed cutting between the Periyár lake and tunnel, and blocking up the curved passages and driving a "heading" through the island in the tunnel leading from the lake.

Estimate—

	RS.
I. Works	1,00,000
II. Establishment	23,000
Total ...	1,23,000

2. Ordered that a copy of these Proceedings together with the plans and estimate for the work be forwarded to the Government of India with a request that sanction thereto may be accorded at an early date.

[Here enter No. 1201 I., dated 22nd December 1906.]

(True Extract.)

C. A. SMITH,
Joint Secretary to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
,, Superintending Engineer, VI Circle.
,, Examiner, Public Works Accounts.

Endorsement—No. 1201 I., dated 22nd December 1906.

Forwarded.

(By order.)

C. A. SMITH,
Joint Secretary to Government,
Irrigation Branch.

Appendix to G.O., No. 1200 I., dated 22nd December 1906.

TABLE showing the loss of head at present Periyár watershed cutting, etc.

Column 1. Lake level.	Column 2. Level in front of head sluice.	Column 3. Level at 2,400 feet from tunnel.	Column 4. Loss of head.
FEET.	FEET.	FEET.	FEET.
118·70	110·60	116·60	8·10
118·95	111·00	116·70	7·95
119·85	113·30	117·35	6·55
119·95	113·75	117·40	6·20
120·25	114·60	117·50	5·65
120·60	115·45	117·90	5·15
120·75	117·20	118·50	3·55
120·90	117·95	118·95	2·95
121·10	118·50	119·40	2·60
121·30	119·10	119·90	2·20
121·45	119·40	120·10	2·05
121·65	119·80	120·45	1·85
122·00	120·65	121·10	1·35
122·20	121·05	121·60	1·15
122·30	121·35	121·85	0·95
122·55	121·70	122·10	0·85
122·70	122·00	122·40	0·70
123·50	122·50	123·10	1·00
123·75	122·85	123·35	0·90
124·45	123·70	123·90	0·75
124·95	124·25	124·55	0·70
125·10	124·50	124·80	0·60
125·60	125·20	125·45	0·40
125·85	125·35	125·65	0·50
125·90	125·55	125·80	0·35
126·10	125·80	126·00	0·30
126·40	126·10	126·30	0·30
126·60	126·30	126·50	0·30
126·80	126·50	126·70	0·30

REMARKS—

Column 1 is the true lake level, and is measured at the main dam.

Column 2 is measured at the head sluice.

Column 3 is measured half a mile above the head sluice at the highest point of the watershed cutting.

The present level of the sill of the head sluice is + 106·75; the width of Stoney's gate across the tunnel is 10 feet and its height 12 feet, and the height of the tunnel a little in rear 10 feet.

Unless the late reading is above + 120·50, water does not reach the crevice of the tunnel and it is therefore impossible to send down a full supply down the tunnel. This is a very great disadvantage at the beginning of the irrigation season when ploughing is going on everywhere, and at the end of the season when it is of great importance in order to economise water to have the power to send down a large supply to the tail end of the channel.

A. R. DECHAZAL,
Executive Engineer, Madura Division.

21st *July* 1906.

1000—18. 8. 06.

6

CURRENT FILE.

Disp. with the Proc 28 No 912-3M 28-8-1906

PAGE 1

PUBLIC WORKS DEPARTMENT, 7

IRRIGATION BRANCH.

Memo No 2374 dt. 7.7-1906

With reference to the Programme Showing forecast of outlay on Productive Public Works during 1907-1908 Submitted with his letter No 387 C.E. dated 30.6.1906 the S.E. II circle is requested to state when the estimate for widening and deepening the water shed Cutting (Item 1 of Pro: form No II) of the Periyar lake therein referred to may be expected in this office

(Sd) F.W.S. Smyth
4.7-06.

To

The Supg: Engr. II Circle.

L. O. 3785

Stock Form No. 141
10,000—29-6-05.

PUBLIC WORKS DEPARTMENT.

2 8

CURRENT No. 4358

ENCLOSURES.	Plans No.	
	Others No.	
	Total	
SPARE COPIES.		

Received 9-8-1906.

Registered 13-8-1906.

Passed on by Registering Clerk ...

" " U. R. Clerk ...

" " Referencer ...

" " Record Superintendent.

" " Drafting Officer ...

Subject.

Estimates & plans for widening & deepening the water shed cutting of the Periyar Lake — Reporting that the — are under scrutiny & will be submitted shortly.

No. 463 CR

Station, Trichinopoly. *Dated the* 7th August 1906.

From (Name) S. D. MURRAY Esquire.,

(Designation) Superintending Engineer, VI Circle.

To ~~The Secretary~~ The Chief Engineer for Irrigation, to the Government of Madras,

Public Works Department.

To lie over pending receipt of the estimate

Sir,

With reference to your Memo.No.2574 dated 7th July 1906, I have the honour to inform you that the estimates and plans for widening and deepening the water shed cutting of the Periyar Lake, have just been received from the Executive Engineer Madura Division. They will be scrutinised and submitted to you as soon as possible.

I have the honour to be,
Sir,
Your most obedient servant,

S D Murray

[illegible] DI. 18/8

Papers

11/8

[illegible] R. 3704 [illegible]

Code Class. X.S INDIAN TELEGRAPHS. Monthly Number. 1(?)

To (Office) Ootacamund From (Office) Ms. Chep

Words.	Day.	Hour.	Minute.	Official Instructions.
22	12	13	6	urgt.

To (Person) Deputy irrigation From* (Person) Manager Madras irrigation

report on berijam project and estimates for deepening periyar watershed cutting not received.

Recd. from LN. Sent to LN.

At Hrs. Mts. by

OOTACAMUND 12 10 06 Telegraph Master.

* In foreign telegrams the Person from, if telegraphed, should be written after, but separated from the text.

G.B.P.—No 818 T—27 5 1905—4000000

38 Word Form.

Defd. Wire S. E. VI circle DI

Plans estes Periar ^enlarging watershed cutting ~~deepening~~ Submitted not received nor report Berijam project

F.W.E.S. 12/10

Despd 12/10/06

A 12/10/06

Urgent

Stock Form No. 141
0,000 – 29-6-05.

10
4

PUBLIC WORKS DEPARTMENT.

CURRENT No. 6248

ENCLOSURES. { Plans No. 10 ✓ / Others No. 1 ✓ } 11

Total 11

Received } 20/10/ 1906
Registered }

SPARE COPIES.

Passed on by Registering Clerk ...
" " U. R. Clerk ...
" " Referencer ...
" " Record Superintendent.
" " Drafting Officer ...

Subject.

Plans & Estn amounting to Rs 90,000 for widening the water shed cutting of the Periyar Lake — forwards for sanction —

No. 608 CE

Station, Trichinopoly *Dated the* 16th October 1906.

From (Name) S. B. Murray Esquire.,

(Designation) Superintending Engineer, VI Circle.

To The Chief Engineer for Irrigation ~~The Secretary~~ to the Government of Madras,

Public Works Department.

Sir,

With reference to the correspondence ending with your telegram dated 12th October 1906, calling for plans and an estimate for widening the water shed cutting of the Periyar Lake, I have the honour to forward herewith for your approval and sanction of Government, an estimate amounting to Rs. 90,000 for the work in question, and to inform you that the Report attached to the estimate fully explains the nature and object of the work.

2

5

2. The work is, as shewn in the Report, directly remunerative and should be charged to the Open Capital Account of the Project. It will probably be completed by the 31st March 1908.

3. The rate for blasting the original watershed cutting varied, it is understood, from Rs. 85 to R110, and I have now allowed a rate of Rs. ~~100~~ 100/- which I think is reasonable.

I have the honour to be,

Sir,

Your most obedient Servant,

S. Murray

Superintending Engineer,

VI Circle.

11

4

Report to accompany the estimate for widening and deepening the watershed cutting between the Periyar Lake and Tunnel.

Amount of Estimate. ———— Rs. 90,000

6248
11

The highest point along the watershed cutting is + 115.21, and the sill of the Head Sluice at the entrance to the tunnel is + 106.75, so, if the cutting were lowered and enlarged, another 8 feet, approximately, of water could be drawn off from the Lake every year. Not only is the cutting too high, but it is also too narrow, the bed width being only 21 feet. The result is that this restricted approach channel causes loss of head, and still further reduces the level of the water at the head of the tunnel. An examination of the accompanying Table shewing loss of head at different levels discloses the fact that when the water level of the Lake falls below + 120.50 full supply cannot be sent through the tunnel and that when it falls to + 118.70 there is only 4 feet of water at the head of the tunnel.

2. An estimate has now been prepared for deepening and widening the cutting, based on the assumption

that

that when the tunnel is flowing just full bore, the discharge is about 1,100 cusecs. The channel cutting must therefore be designed, to carry this discharge with a depth of 10 feet, which is the height of the tunnel. The estimate has been prepared, allowing a bed fall through the cutting of 1 foot per mile — with this fall, and a depth of water of 10 feet, a channel 35 ft. wide is required. This will bring the highest point of the cutting down to + 108.00 (approximately).

3. The Capacity of the Lake at its present F.T.L. i.e., + 144.00 is ————	13,299. M. C. ft.
The capacity at level + 118.00 is ———	7359 "
Therefore the amount of water now available for Irrigation is ———	5940 "

The area irrigated by Periyar water ~~cutting~~ during 1904–05, including the additional supply given to the old irrigated — area, was

1st crop. ————	1,13,451 acres.
2nd " ————	4[illegible],183 "
Total	1,56,634 "

The work of the Lake may therefore be taken to be 26.4 acres per million C. ft. of Storage. Using this figure it will be possible to see what will be the result of lowering the watershed cutting.

The capacity of the Lake at + 118.00 is ———	7,359 M. C. ft.
At + 108.00. it is ————	5,691 "

Therefore

Therefore the additional amount of water that ~~would~~ will be made available for irrigation after lowering the cutting will be . . . . – – – – – – . 1,668 M.C.ft.

This argument is wrong

Therefore the additional area which can be irrigated will 1,668 × 26.4 = 44,035 acres.

This figure, of course, represents the maximum benefit that would be derived from the lowered cutting, and it depends upon the lake receiving a constant and steady supply during the irrigation season.

The accompanying discharge table shews that out of the last seven years this condition would have been fulfilled in four of them, in another the Lake would have been more than full at the end of August in another at the end of July. Last year the Lake did not surplus at all.

Assuming this last and most unfavourable case, the additional water made available by lowering the cutting would be 1,668 M. C. ft. Taking the low duty of 5 acres per million C-ft, a duty which has often been exceeded in the Periyar tracts, this would mean an increase of 8,340 acres, which at Rs 6/- per acre, represents a revenue of Rs. 50,040.

Under

under the very worst conditions imaginable there-
fore the annual return on the work would be more
than half its estimated cost (Rs. 90,000).

S. V. Iyer [signature]
Superintending Engineer,
VI Circle.

Para 3 of report.

To arrive at the value of the extra storage, 1668 mill c ft provided by this proposal it is necessary to consider what its effect would have been in past years, the extra storage capacity is only useful in a year when the following conditions are fulfilled ~~when~~ (1) there is no surplus were left in the lake at the end of the year & (2) when the extra supply was available either in the year under consideration or by surplus from ~~the~~ a previous year.

Careful examination of the records of discharges shows that in the ten years during which the project has been working both these conditions are fulfilled only in 1898-99 & 1904-05, ~~in~~ the ~~[illegible]~~ other years of short supply 1899-1900 & 1905-06 followed these & there would have been no extra supply in the river to make up

14

for the draw-off.

The value to irrig^n of the extra storage of 1668 mills cft in a bad year is however not to be measured by the area which this quantity of water could irrigate [margin: for a whole [illegible]] but by the much greater area, perhaps ~~4 or 5~~ 5 or 6 times the above which it would bring to maturity and save remissions upon, it is only a months supply that is required & the value to 1900+ in either of the two ~~yea~~ useful years would be R4 × 5 × 5 × 1668 = R1,66,800 at the rate of 4 acres to the million cft & 5/- per acre.

Thus the average annual value would be on the ten years $\frac{2}{10}$ × 166800 = R33360 or 33 per cent on the proposed expenditure

Stock Form No. 141
10,000 - 29-6-05.

67

PUBLIC WORKS DEPARTMENT.

15

CURRENT No. 6293

ENCLOSURES. { Plans No. 1
Others No. 1

Total 2

SPARE COPIES.

Received .... 190 .
Registered 22-10-1906.

Passed on by Registering Clerk ... do
" " U. R. Clerk ...
" " Referencer ...
" " Record Superintendent ...
" " Drafting Officer ...

Subject.

Estimate Rs 10,000 for Blocking up the Curved passages & driving a heading thro' the "island" in the tunnel leading from the Periyar Lake — Submits for Sanction —

No. 615 CR

Station, Trichinopoly. *Dated the* 20th October 1906.

From (Name) S. B. Murray Esquire.,

(Designation) Superintending Engineer, VI Circle.

To *The Chief Engineer* for Irrigation, ~~*The Secretary*~~ *to the Government of Madras,*

Public Works Department.

Sir,

I have the honour to forward herewith for your approval and sanction of Government, an estimate amounting to Rs 10,000/- for blocking up the curved passages and driving a heading through the — "island" in the tunnel leading from the

Periyar Lake.

2. The advantages and the object of the proposed work are fully explained in the report attached to the estimate.

3. The work will not be directly remunerative in itself, but as it is required for the full development of the Periyar Project, it may be charged to the Open Capital Account. It will probably be completed by the 31st March 1908.

I have the honour to be,
Sir,
Your most obedient Servant,

[illegible]

Superintending Engineer,
VI Circle.

[illegible]

1,000—23-3-05.

NOTES.

1

17

Estimate of Rs.90,000 for widening the water shed cutting of the Periyar Lake.

P.W.D., Irrigation Branch.

(C.No.6248) from the Supg. Engineer, VI Circle, No.608 C.E., d/16-10-06.

D.E.I.

Submitted for orders.

LR
23.10.06

no paper to note on

Put up diagrams prepared for Periar Power scheme.

JWG
23/10/06

average useful

1668
2
3336

333.6
5
1668 0
5
83 40

9000

Estt of quantity of water in excess of present supplies available by the widening & deepening of the watershed cutting

1896-97.	nil, surplus & large balance at end of year
1897-98	ditto
1898-99.	1668 mills cft.
1899 1900	nil, lake did not fill & would have started at the lower level & finished at it.
1900-01.	Extra receipt of 1668 mills cft, but could not be used without enlarging tunnel
1901-02	nil surplus & balance
1902.03	nil "
1903.04	nil "
1904-05.	1668 mills cft.
1905.06	nil, reservoir did not fill.

Thus the average annual storage is $\frac{1668 \times 2}{10}$ or 333.6 mills cft.

The cost of this is

$\frac{90000}{333.6}$ = Rs 270 per mill cft against about Rs 1000

Rs1000 the cost of the original head works including tunnel per mill cft of storage.

The value of the extra storage is however hardly to be guaged by ordinary rules, when required at all it is required very badly the extra supply would in certain years save a very large area from being ruined & herein lies its chief value,

Taking it at ordinary water rates we have on the average;—

333.6 mill cft = 1668 acres the revenue from which would be 5 X 1668 = Rs8340 or 9[illegible] per cent on the proposed expenditure.

[illegible signature]

24/10/06

Submitted for orders

There is no doubt whatever that the work will be of great use & [illegible] what should be checked at once have to be a matter A [illegible] report will

20

here as the E.E.'s arguments are not sound.

The estimate for driving a heading through the island in the tunnel should be amalgamated with this.

$\frac{13}{20.12.06}$ attended to.

GS
16/10

12 8

PUBLIC WORKS DEPARTMENT.

(Irrigation Branch).

(Current No. 6293) from the Supg. Engineer, VI Circle, No.615 C.B., d/20-10-

Subject.

Estimate of Rs.10,000 for blocking up the curved passages, and driving a heading through the "Island" in the tunnel leading from the Periyar Lake.

D.E.I.

Submitted for orders.

23/10/06

This may be included in the est for the water shed cutting.

24/10

attendant

13 6

PUBLIC WORKS DEPARTMENT.

(Irrigation Branch).

Current Nos. 6268/20/10/06 & 6293/20/10/06

1.	Estimate for widening the watershed cutting of the Periyar lake	90,000
2.	Blocking up the curved passages and driving a head through the island in the tunnel leading from the Periyar lake	10,000
	Total Rs	100000

The estimates have been checked and the amount increased to Rs 1,04,200 owing to errors found in the detail calculations of Estimate No. 1.

T

[initials] 20/10/06

E.I. wants a fresh report on the estimates.

C.S.I. Please include the est. now sent in and prepare a fresh abstract showing both the estimates together.

SB 21.11.06

Please see E.I.'s alterations in them and alter the estimates within [illegible] fair copy for E.I.'s signature. SB 26.11.06. The report is [illegible]

T.

Necessary alterations have been carried out in the estimate and a fair copy prepared for E.I.'s signature. Please say if the papers may be passed on to E.I.?

Yes. SB [illegible].11.06.

[initials] 28/11/06

[illegible] [illegible] the [illegible]

KW 6248 + 6293 Periyar Watershed – Cutting

PUBLIC WORKS DEPARTMENT.
(Irrigation Branch).

D.I.

A draft order approving the estimate for the watershed cutting, Periyar Project, is submitted and may, if approved, be circulated to H.E.

Mb
5.12.06

D.I.
A typed copy of the draft ... as ... by D.I. ... for approval ...
Mb
5.12.06 ... typed ...

[illegible]
6/12/06.

Flag X

Put up I.G.I. Note of Inspection

[illegible]
10/12

E.I.

Please see G.O. No. 702-I d/ 27.6.06 – Flag X.

Mb
10.12.06

The Long. section is incomplete as it does not show the position of the present head drain. It also ... the level of the drops ... ... in Para 6 of I.G.I.'s Note ... these ... must be supplied before it goes on.

It would also be better if it were to show the Long. section of the channel as well.

To be shown in office today [illegible]
?/12

Periyar Water Shed cutting 15

Public Works(Irrigation)Department.

Note for His Excellency.

When the Inspector General of Irrigation inspected the Periyar Works last March, it was brought to his notice by Mr. Keeling who on account of his intimate acquaintance with the works was deputed to accompany the Inspector General that by lowering the water shed cutting an extra 8 ft. or so of water in the lake would at once be made available for use.

Accordingly the Inspector General in his Note recommended that the execution of this work should be dealt with along with certain other suggestions for increasing the scope of the Project. The principal of them is the proposed Pambiyar extension which is under investigation but as the lowering of the water-shed cutting will at once give an extra available capacity of 1668 millions cubic feet and it will not in any way interfere with further widening of the cutting and enlargement of the tunnel which may be found necessary hereafter it has been separately estimated for and a draft order forwarding it to India for sanction is submitted for approval.

WAS
15/12

15/12/06

19.12.06.

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

PERIYAR WATER-SHED CUTTING.

READ the following

To the Supg. Engineer, VI Circle d/ 7-7-06, No.2374.
From do do do d/ 7-8-06, No.463 C.E.
Telegram to do do d/ 12-10-06.
From do do d/ 16-10-06, No.608 C.E.
From do do d/ 20-10-06, No.615 C.E.

CURRENT No. 13528
PASSED ON BY 22-12-06
C. C.
REF.
R. K.
D. O.

Issue urgently
D.J. 20/12

Note by the Chief Engineer for Irrigation.

The Supg.Engr, VI Circle, submits two estimates, aggregating Rs.1,00,000, (1) for widening and deepening the watershed-cutting between the Periyar Lake and the Tunnel and (2) for blocking up the curved passages and driving a "heading" through the island in the tunnel leading from the lake; these estimates have been prepared on the suggestion of the Inspector-General of Irrigation, after his recent inspection of the works. Vide letter from the Govt of India No. 575 I dy 4-5-06 printed with G.O. No. 702 I 5-6-06

2. With regard to the first estimate, it is stated that the present cutting between the Periyar Lake and the tunnel is too narrow and insufficiently deep, the bed-level at its highest point being + 115.21, while the sill of the headsluice in front of the tunnel is + 106.75, with the result that loss of head and reduction in the level

level of water are thereby caused at the head of the tunnel. Under the conditions obtaining at present, full supply cannot be sent down the tunnel when the water in the lake falls down to + 120.50, and no supply can be drawn from the lake below + 115.21.

3. The estimate, therefore, provides for widening the cutting from 21 to 35 feet with bed-fall of 1 foot per mile so as to bring the highest point of the cutting down to + 108.00 nearly. This will enable it to discharge, with a depth of 10 feet, 1100 c.ft per Second which is the maximum quantity the tunnel is estimated to pass when it is flowing full bore.

4. The above improvements, if carried out, will, it is stated, enable another 8 feet of water to be drawn off for irrigation from the lake every year, thus providing an additional storage of 1668 mills c. feet.

5. The value to irrigation of this extra storage in a bad year should not be measured by the additional area which it would supply for a whole season but by the area that it will protect from failure and bring to maturity by providing an extra month's supply as pointed out in the report. It is estimated that the average annual revenue will be Rs.33,360 equivalent to a return of about 33% on the proposed expenditure.

6. The execution of this work will depend

9

depend greatly upon the state of the season as it would be unwise to purposely run water to waste in order to carry it out.

7. As regards the other estimate, the original design consisited of two semicircular passages at the mouth of the tunnel with a double faced gate closing their entrances into it so that the water pressures on the gate would counteract one another. This design being found unworkable, a single gate was placed at the head of the tunnel, above the passages. As the bifurcation and the susbequent rejoining of the tunnel passages have always been considered to cause a diminished discharge through the tunnel, it is now proposed to close them and to make a straight cut with a sectional area 166 sq.ft.rather more than that of the tunnel itself.

p12 gcf

8 As the two estimates relate to one and the same work, they have been merged into one, amounting to Rs.1,00,000 or Rs.1,23,000 including establishment charges, which it is recommended, may be approved and forwarded to the Govt. of India for sanction under the Open Capital Account of the Periyar Project.

9. As the execution of the work now provided for will in no way interfere with any further increase of dischar[ge] capacity which may be found neces[sary]

12 28 108

in connection with the other works - suggested in the Inspector General's note and as its benefit will be felt as soon as it is completed, it is -- considered that it should be sanctioned separately.

10. The work is classed as "remunerative" and will probably be completed by 31st March 1910.

ORDER No. 1200 I, 8 22-12-1906

The following estimate is approved.

Imperial.

Capital expenditure not charged to Revenue

49. Irrigation.

Periyar Project.

Open Capital Account.

I. Works

1. Head Works.

L. Earthwork.

Widening and deepening the water-shed cutting between the Periyar Lake and Tunnel, and blocking up the curved passages and driving a "heading" through the island in the tunnel leading from the lake.

Estimate -	I Works--	Rs. 1,00,000
	II Establishment	23,000
		1,23,000

2. Ordered that a copy of these Proceedings together with the plans -- and estimate for the work be forwarde

to the Government of India with a request that sanction thereto may be accorded at an early date

Endorsement No. 1201 I, 822-12-1906

Forwarded.

[illegible]
15/12/06

To the Chief Engr. for Irrgn.
" Supdg. Engr. VI Circle.
" Examiner P.W. Accounts

Ordinary Press. Despd. 8/1/07.

6

30 8 1908

Table showing the loss of head at present Periyar watershed cutting: ~~from readings taken in 1905 etc.~~

Col 1 Lake level Feet	Col 2 Level in front of Headsluice Feet	Col 3 Level at 2400' from tunnel Feet	Col 4 Loss of Head Feet	Remarks.
118.70	110.60	116.60	8.10	Col 1. is the true lake level,
118.95	111.00	116.70	7.95	and is measured at the Main
119.85	113.30	117.35	6.55	Dam.
119.95	113.75	117.40	6.20	Col 2. is measured at the Head Sluice
120.25	114.60	117.50	5.65	Col 3 is measured ½ a mile above
120.60	115.45	117.90	5.15	Headsluice, at the highest point
120.75	117.20	118.50	3.55	of the watershed cutting.
120.90	117.95	118.95	2.95	The present level of the sill of the
121.10	118.50	119.40	2.60	Head Sluice is + 106.75, the width of
121.30	119.10	119.90	2.20	Stoney's Gate across the tunnel is 10 ft
121.45	119.40	120.10	2.05 ~~1.9~~	& its height 12 ft, and the height of
121.65	119.80	120.45	1.85	the tunnel a little in rear 10 feet.
122.00	120.65	121.80	1.35	Unless the lake reading is above
122.20	121.05	121.60	1.15	+ 120.0, water does not reach the crown
122.30	121.35	121.85	0.95	of the tunnel & it is therefore impossible
122.55	121.70	122.10	0.85	to send down a full supply down
122.70	122.00	122.40	0.70	the tunnel. This is a very great dis-
123.50	122.50	123.10	1.00	advantage at the beginning of the
123.75	122.85	123.35	0.90	Irrigation season, when ploughing is
124.45	123.70	123.90	0.75	going on everywhere, & at the end of
124.95	124.25	124.55	0.70	the season when it is of great importance
125.10	124.50	124.80	0.60	in order to economise water, to

125.60	125.20	125.45	0.40
125.85	125.35	125.65	0.50
125.90	125.55	125.80	0.35
126.10	125.80	126.00	0.30
126.40	126.10	126.30	0.30
126.60	126.30	126.50	0.30
126.80	126.50	126.70	0.30

leave the power to ... a large supply to the tail ... of the channel.

Rew' ae Chegel
21-7-03

Executive Engineer
Madura Division

6248

31

P. W. D.

NOTE FOR THE SUPERINTENDENT,
GOVERNMENT PRESS.

Please have the accompanying statement printed as an Appendix to G.O. No 1200 d dated 22nd December 1906 & kindly supply 170 copies as soon as possible.

P. Vaidyanathaiyar
17/1/07
Head Clerk
P.W. Secretariat

[initials]
17-1-07

GOVERNMENT PRESS
17 JAN 1907
MADRAS

18 1/2014.5.6.